

two combination values, and the first and second combination values are such that upon turning the key through a first turning angle in the first turning direction, the combination surface corresponding to the first code locking disc engages the first counter surface bounding the key opening of the first code locking disc and the combination surface corresponding to the second code locking disc clears the first counter surface bounding the key opening of the second code locking disc, and upon turning of the key in the first turning direction through a further turning angle the combination surface corresponding to the second code locking disc engages the second counter surface bounding the key opening of the second code locking disc.

REMARKS

Applicant wishes to thank the examiner for the courtesy extended to the undersigned representative during the telephone interview that took place on June 4, 2002. During the telephone interview, the examiner indicated that the wording added to claim 1 was not of such a nature that it would be regarded as reciting a functional limitation without structural support. However, the examiner did not indicate whether the claims, as now amended, would be patentable. If the examiner considers that the claims are not patentable, applicant requests that he should contact the undersigned by telephone before issuing a final rejection in order to explore the possibility of making additional amendments.

Claims 12, 14-20 and 22-27 stand rejected under 35 USC 112, second paragraph. Claims 12 and 20 are directed to a key blank and a key respectively and therefore do not further limit the scope of claim 1. Applicant relies on the structure of the lock to define the key (in claim 20) that is suitable for the lock and to define the key blank (in claim 12) that can be used to make a key suitable for the lock. Applicant has amended claims 12 and 20 to include the appropriate structural features of the lock. It is believed that claims 12 and 20, as amended, are not open to rejection under 35 USC 112, second paragraph.

Claims 1-3, 5-8, 10, 12, 14-20 and 22-27 stand rejected under 35 USC 102 or 35 USC 103. The main reference relied upon by the examiner is GB '119.

Claim 1 has been amended to recite more specifically that the openings of the code locking discs are bounded by at least first and second discrete counter surfaces and that upon turning the key

through a first turning angle, the combination surface corresponding to the first code locking disc engages the first counter surface bounding the key opening of the first locking disc and the combination surface corresponding to the second code locking disc clears the first counter surface bounding the key opening of the second code locking disc, and upon turning of the key in the first direction through a further turning angle, the combination surface corresponding to the second code locking disc engages the second counter surface bounding the key opening of the second code locking disc. This wording reads on, for example, the combination values 2. and 3. shown in FIGS. 5 and 6, wherein if the combination surface corresponding to the first code locking disc has the combination value 2. and the combination surface corresponding to the second code locking disc has the combination value 3., upon turning the key the combination surface corresponding to the first code locking disc (FIG. 5b) engages the outer counter surface 4a11 (see FIG. 4) bounding the key opening of the first code locking disc and the combination surface corresponding to the second code locking disc (FIG. 5d) clears the first counter surface 4a11 bounding the key opening of the second code locking disc and upon turning of the key through a further turning angle the combination surface corresponding to the second code locking disc engages the second counter surface 4a12 bounding the key opening of the second code locking disc.

In the rejection of claim 1, the examiner has not given any patentable significance to the limitations in the last paragraph of the claim. Applicant submits that the limitations in the last paragraph of claim 1, both as previously filed and as now amended, are of patentable significance and that when appropriate weight is accorded to all limitations of claim 1, the examiner will agree that claim 1 is not anticipated by GB '119.

Applicant submits that even if the wording in the last paragraph of claim 1 is functional, it is of a nature such that it should be accorded patentable significance. The normal rule against according patentable significance to functional language applies when the functional language does not allow the skilled reader, acting in good faith, to interpret the claim and determine what structure is implied by the functional language. For example, if a claim recited a screw with a head at one end and a cavity in the head and stated that the cavity was noncircular "whereby upon inserting a bit of a drive tool in the cavity, the screw may be

rotated," one might reasonably say that the functional language is not entitled to patentable significance because the nature of the drive tool is not defined. It might have a hexagonal bit or a star-shaped bit, for example. If, on the other hand, the claim recited a drive tool having a hexagonal bit and a screw having a head formed with a cavity for receiving the bit of the drive tool "whereby upon inserting the bit of the drive tool in the cavity, the screw may be rotated," the skilled reader would understand that the cavity must be of a shape and size to receive the hexagonal bit of the drive tool yet not permit the bit to rotate freely in the cavity, and accordingly this language should be accorded weight in determining the scope of the claim and whether the claim distinguishes over the prior art. The difference is that in the first case the tool bit is not recited as an element of the claim whereas in the second case the tool bit and its configuration are recited.

In the case of the last paragraph of claim 1, we are concerned with the interaction between a key and first and second code locking discs. Claim 1 recites as an element of the claim a key insertable in the lock and having first and second combination surfaces corresponding respectively to the first and second code locking discs for engaging a counter surface of each code locking disc and applying turning force thereto when the key is inserted in the lock and is turned in the first turning direction. Claim 1 also refers to the key openings of the first and second locking discs each being bounded by at least first and second discrete counter surfaces, and states that the combination surface corresponding to the first code locking disc is provided with a first of at least two combination values and that the combination surface corresponding to the second code locking disc is provided with a second of the combination values. Thus the first and second code locking discs and their counter surfaces are defined in claim 1 and the key and the combination surfaces corresponding to the first and second code locking discs and the combination values of the combination surfaces corresponding to the first and second code locking discs are also defined in claim 1. Accordingly, claim 1 defines a structural relationship between the key and the first code locking disc and defines a structural relationship between the key and the second code locking disc. This structural relationship does not apply to the mechanism disclosed by GB '119, as interpreted by the examiner. Thus, in discussing claim 2, the examiner appears to consider that the surface marked 18 in FIG. 2 is an apt counterpart of one of the

discrete counter surfaces of the key opening and that the diametrically opposite (unmarked) surface is an apt counterpart for the second discrete counter surface of the key opening. However, GB '119 does not disclose or suggest that upon turning the key a combination surface of the key should clear the surface 18 and, upon further turning of the key, the combination surface should engage the diametrically opposite surface.

In view of the foregoing, it is submitted that claim 1 is patentable over the prior art. It follows that the dependent claims 2-11 and 30 also are patentable.

The new claim 30 is dependent on claim 1 and specifies that the two discrete counter surfaces bounding the key opening of the first code locking disc are within a common quadrant of the first code locking disc. Claim 30 is supported by, for example, FIG. 4a, which shows the discrete counter surfaces 4a11 and 4a12 within the first quadrant of the code locking disc 4. This further distinguishes over GB '119 where the two surfaces identified by the examiner with the discrete counter surfaces of claim 1 are not within a common quadrant but are diametrically opposite each other. Claim 30 is therefore patentable independently of claim 1.

The new claim 31 is similar in many respects to claim 1 but is limited to the key being in the lock and to the code locking discs being in the initial position. Further, whereas claim 1 is limited to the key having the correct combination to operate the cylinder lock, claim 31 is not limited to the key having the correct combination. Requiring that the key be in the lock is similar to requiring that the tool bit in the example discussed above be present in the cavity in the head of the screw and serves to emphasize the structural relationship between the combination surfaces of the key and the respective locking discs.

Claim 31 is patentable for similar reasons to those presented in support of claim 1.


Claim 20 is directed to a key suitable for use in the cylinder lock and key combination and defines the basic form of the shank of the key, exclusive of grooves extending over the shank of the key. According to claim 20, the key is substantially rectangular in the perpendicular cross-sectional plane except for at least one bevel surface providing at least first and second combination surfaces and having first and second combination values respectively. Further, the first combination surface differs from the second combination surface with respect to the combination of the angle of the cut and

the length of the cut in the bevel surface. This key configuration differs from the configuration of the key disclosed by GB '119. For example, the key shown by GB '119 includes the key rib 24. Therefore claim 20 is patentable and it follows that the dependent claims 22-27 also are patentable.

GB '119 does not disclose a key blank and therefore GB '119 cannot anticipate claim 12. In any event, it appears that the key blank used to form the key shown by GB '119 would not be substantially rectangular in the perpendicular cross-sectional plane of the shank since it would include the key rib 24 and the arcuate shoulders on each side of the rib 24.

It is therefore submitted that claim 12 is patentable and it follows that the dependent claims 14-19 also are patentable.

Respectfully submitted,



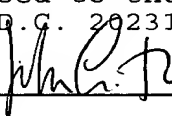
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Pekka MIELONEN et al

Art Unit: 3627

Application No: 09/405,436

Examiner:
Lloyd A. Gall

Filed: September 23, 1999

For: CYLINDER LOCK-KEY-COMBINATION

SCHEDULE OF CLAIM AMENDMENTS

Claims 1, 12 and 20, rewrite as follows:

1. (Thrice Amended) A cylinder lock and key combination comprising:

a lock body,

a turnable lock cylinder located inside the lock body and having an axial slot,

a set of code locking discs located inside the lock cylinder, each locking disc having at least one peripheral notch and a key opening and being turnable in the lock body in a first turning direction about a turning axis by application of turning force to a counter surface bounding the key opening, each locking disc having an initial position, such that when all the locking discs are in their respective initial positions the key openings form a key passage, and an opening position in which its peripheral notch is at the position of the axial slot in the lock cylinder, such that when all the locking discs are in their respective opening positions the peripheral notches form a uniform channel at the position of the axial slot, the key openings of at least first and second code locking discs each being bounded by at least [two] first and second discrete counter surfaces such that the first code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the first code locking disc and the second code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the second code locking disc,

a locking bar having a locking position in which it prevents turning of the cylinder relative to the lock body and a releasing position in which it is received in the channel formed by the peripheral notches of the locking discs and releases the cylinder for turning relative to the lock body, and

a key insertable in the lock when the locking discs are at [an] the initial position, the key having a set of combination surfaces corresponding respectively to the locking discs, for engaging a counter surface of each locking disc and applying turning force thereto when the key is inserted in the lock and is turned in the first turning direction, so that the locking discs are turned in the first turning direction to their respective opening positions,

and wherein the combination surface corresponding to said first code locking disc is provided with a first of at least two combination values and the combination surface corresponding to said second code locking disc is provided with a second of said at least two combination values, and the first and second combination values are such that [the first code locking disc is turnable in the first turning direction by a key of which the combination surface corresponding to the first code locking disc has either said first combination value or said second combination value and the second locking disc is turnable in the first turning direction by a key of which the combination surface corresponding to the second locking disc has either said first combination value or said second combination value, but only a key of which the combination surface corresponding to the first code locking disc has the first combination value and the combination surface corresponding to the second locking disc has the second combination value is able to turn the first and second code locking discs to their respective opening positions,

and wherein a first of said discrete counter surfaces bounding the key opening of the first code locking disc corresponds to a smaller turning angle of the key and a second of said discrete counter surfaces corresponds to a larger turning angle] upon inserting the key in the key passage and turning the key through a first turning angle in the first turning direction, the combination surface corresponding to the first code locking disc engages the first counter surface bounding the key opening of the first code locking disc and the combination surface corresponding to the second code locking disc clears the first counter surface bounding the key opening of the second code locking disc, and upon turning of the key in the first turning direction through a further turning angle the combination surface corresponding to the second code locking disc engages the second counter surface bounding the key opening of the second code locking disc.

12. (Amended) A key blank of a key for operating a [combination according to claim 1,] cylinder lock comprising:

a lock body,

a turnable lock cylinder located inside the lock body and having an axial slot,

a set of code locking discs located inside the lock cylinder, each locking disc having at least one peripheral notch and a key opening and being turnable in the lock body in a first turning direction about a turning axis by application of turning force to a counter surface bounding the key opening, each locking disc having an initial position, such that when all the locking discs are in their respective initial positions the key openings form a key passage, and an opening position in which its peripheral notch is at the position of the axial slot in the lock cylinder, such that when all the locking discs are in their respective opening positions the peripheral notches form a uniform channel at the position of the axial slot, the key openings of at least first and second code locking discs each being bounded by at least first and second discrete counter surfaces such that the first code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the first code locking disc and the second code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the second code locking disc, and

a locking bar having a locking position in which it prevents turning of the cylinder relative to the lock body and a releasing position in which it is received in the channel formed by the peripheral notches of the locking discs and releases the cylinder for turning relative to the lock body,

wherein the key blank includes an elongate shank and the basic form of [a] the shank of the key blank in the perpendicular cross-sectional plane of the shank, exclusive of any possible profile grooves or corresponding grooves extending [over] longitudinally of the shank of the key, is substantially rectangular except for at least one bevel surface for providing at least one combination surface at least one corner.

20. (Twice Amended) A key for operating a [combination according to claim 1,] cylinder lock comprising:

a lock body,

a turnable lock cylinder located inside the lock body and having an axial slot,

a set of code locking discs located inside the lock cylinder, each locking disc having at least one peripheral notch and a key opening and being turnable in the lock body in a first turning direction about a turning axis by application of turning force to a counter surface bounding the key opening, each locking disc having an initial position, such that when all the locking discs are in their respective initial positions the key openings form a key passage, and an opening position in which its peripheral notch is at the position of the axial slot in the lock cylinder, such that when all the locking discs are in their respective opening positions the peripheral notches form a uniform channel at the position of the axial slot, the key openings of at least first and second code locking discs each being bounded by at least first and second discrete counter surfaces such that the first code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the first code locking disc and the second code locking disc can be turned in said first turning direction by application of turning force to any one of said discrete counter surfaces of the second code locking disc, and

a locking bar having a locking position in which it prevents turning of the cylinder relative to the lock body and a releasing position in which it is received in the channel formed by the peripheral notches of the locking discs and releases the cylinder for turning relative to the lock body,

the key having [a] an elongate shank of which the basic form in the perpendicular cross-sectional plane of the shank, exclusive of any possible profile grooves or corresponding grooves extending [over] longitudinally of the shank of the key, is substantially rectangular except for at least one bevel surface for providing combination surfaces corresponding to the code locking discs, said one bevel surface providing at least first and second combination surfaces corresponding to the first and second code locking discs respectively and having said first and second combination values

respectively, and wherein the first combination surface differs from the second combination surface with respect to the combination of the angle of the cut and the length of the cut in said one bevel surface.